STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Physics**		Code **1010604211010400206**
Field of study **Transport**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 1**
Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **part-time**	
No. of hours Lecture: **20** Classes: **-** Laboratory: **10** Project/seminars: **-**		No. of credits **4**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**	

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**2 50%**
the sciences	**2 50%**
Physical sciences	**2 50%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Fundamental knowledge of physics; basic level according to the secondary school syllabus. Knowledge of mathematics including integration and differentiation calculus.
2	**Skills**	Solving elementary physical problems based on acquired knowledge. Ability to draw information from recommended sources.
3	**Social competencies**	Understanding of necessity of own competence broadening, readiness to cooperate within group.

Assumptions and objectives of the course:

1. Presentation of fundamental knowledge of physics in the range determined by the syllabus of the subject of study.

2.Development ability to solve physical problems, to perceive potential applications in studied subject, doing experiments and analyze results based on acquired knowledge.

3.Mould student?s abilities within group cooperation.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Students have fundamental knowledge in the following areas of physics mechanics, optics, electricity, magnetism, selected problems of theory of relativity ,selected problems of nuclear physics, selected problems of quantum physics - [K1A_W02]

2. Students are able to define basic physical terms and quantities with proper units and give examples of their applications in real cases and technical sciences - [K1A_W02]

3. Students are able to formulate and explain basic physical laws, are able to define their range of applications with special emphasis on studied subject - [K1A_W02]

Skills:

1. . Students are able to use the fundamental laws of physics and simplified models in solving simple problems in the range determined by the syllabus - [K1A_U01]

2. Students are able to use (with understanding) recommended knowledge sources (basic literature index) and derive knowledge from other sources for self-education purpose - [K1A_U01]

3. Students are able to carry out and analyze basic physical experiments (by oneself and in group) - [K1A_U07]

Social competencies:

1. . Students are able to cooperation within group, are able to take responsibility for the results of both own and team work , are able to engage in solving basic problems - [K1A_K04]

Assessment methods of study outcomes

Lecture:

Written exam that is aimed at students knowledge evaluation based on their explanations of choosen physics problems, current evaluation of students activity (score scale, fewer than 50% correct answers < insufficient, 50.1-60% - sufficient, 60.1-70% - sufficient plus, 70.1-80% - good, 80.1-90% - good plus, from 90.1% - very good).

Course description

1. Classical mechanics including:
- kinematics and dynamics of translational motion (laws of dynamics, law of energy and moment of momentum conservation),
- kinematics and dynamics of rotational motion (laws of dynamics, law of moment of momentum conservation),
- harmonic vibrations free and forced (including the resonance phenomenon),
- mechanical waves,

2.Gravitational interactions:
- low of universal gravitation,
- scalar and vector description.

3. Fundamentals of special theory of relativity.

4. Electromagnetism:
- electrostatics (including the Gauss law),
- electric current,
- magnetostatics (including the Ampere law),
- electromagnetic induction (the Faraday law),
- electromagnetic waves (energy, momentum, polarisation).

5. Optics:
- geometric optics (the law of light reflection and refraction),
- wave optics (interference and diffraction).

6. Fundamentals of quantum physics:
- quantum character of light,
- elementary problems of the structure of atom.

Basic bibliography:

1. D.Halliday, R.Resnick, J.Walker, Fundamentals of Physics, Wiley 2009
2. J.Massalski, M.Massalska, Physics for engineers, WNT, Warszawa 2006
3. K.Jezierski, B.Kołodka, K.Sierański, Physics. Problems with solutions, Scripta, Wrocław 2007

Additional bibliography:

1. J. Orear, Fizyka, WNT 1990. 2. J. Masalski, Fizyka dla inżynierów t.1-2, WNT Warszawa 1980.

Result of average student's workload

Activity	Time (working hours)
1. Exam/credit of lecture	26

Student's workload

Source of workload	hours	ECTS
Total workload	107	4
Contact hours	53	2
Practical activities	51	2